



High-resolution forest carbon modeling for climate mitigation planning over the RGGI region, USA

Lei Ma, George Hurtt, Hao Tang, Rachel Lamb, Elliott Campbell, Ralph Dubayah, Maddie Guy, Wenli Huang, Andrew Lister, Jiaming Lu, Jarlath O'Neil-Dune, Alex Rudee, Quan Shen and Carlos Silva, *Environ. Res. Lett.*, <https://doi.org/10.1088/1748-9326/abe4f4>.

Science Question

- What are contemporary aboveground carbon stocks and future aboveground carbon sequestration potential over the RGGI region?
- How can ecological modelling and remote sensing (lidar & optical) be integrated to improve regional forest carbon modelling?

Method

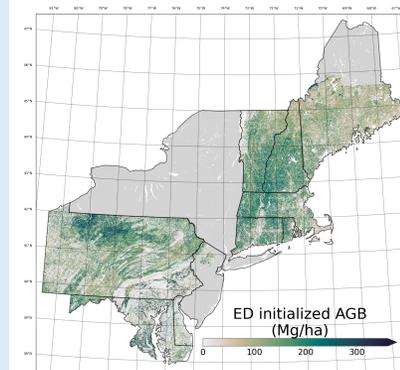
Ecosystem modeling (i.e., Ecosystem Demography, ED), high-resolution airborne lidar and NAIP imagery, field data, meteorology, soil properties are combined to develop regional forest carbon modeling system, which provide estimates of aboveground carbon dynamics from present to future at 90 m resolution.

Result/ Significance

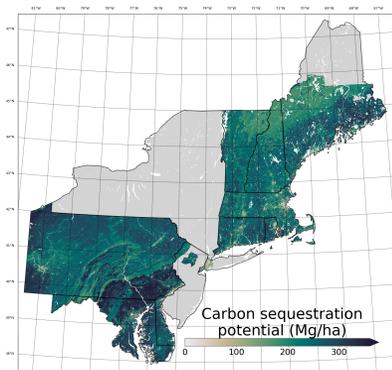
- High-resolution forest modeling can capture fine-scale heterogeneity and benefit regional planning efforts of climate mitigation.
- Contemporary aboveground carbon stocks and future aboveground carbon sequestration potential gap are estimated to 1,134 Tg C and 1,776 Tg C for states of CT, DE, MD, MA, NH, PA, RI and VT.
- Partition of carbon sequestration between continued growth of existing trees and new afforested/reforested areas varies with states, depending on contemporary conditions.

90 m estimates

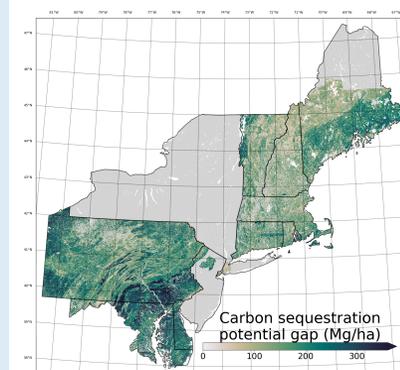
Contemporary AGB



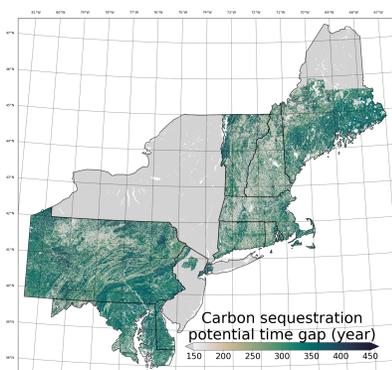
Sequestration Potential



Sequestration Potential Gap



Time Gap



Statewide total potential AGB from present to 300 years in future

